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Pine Tortoise Scale

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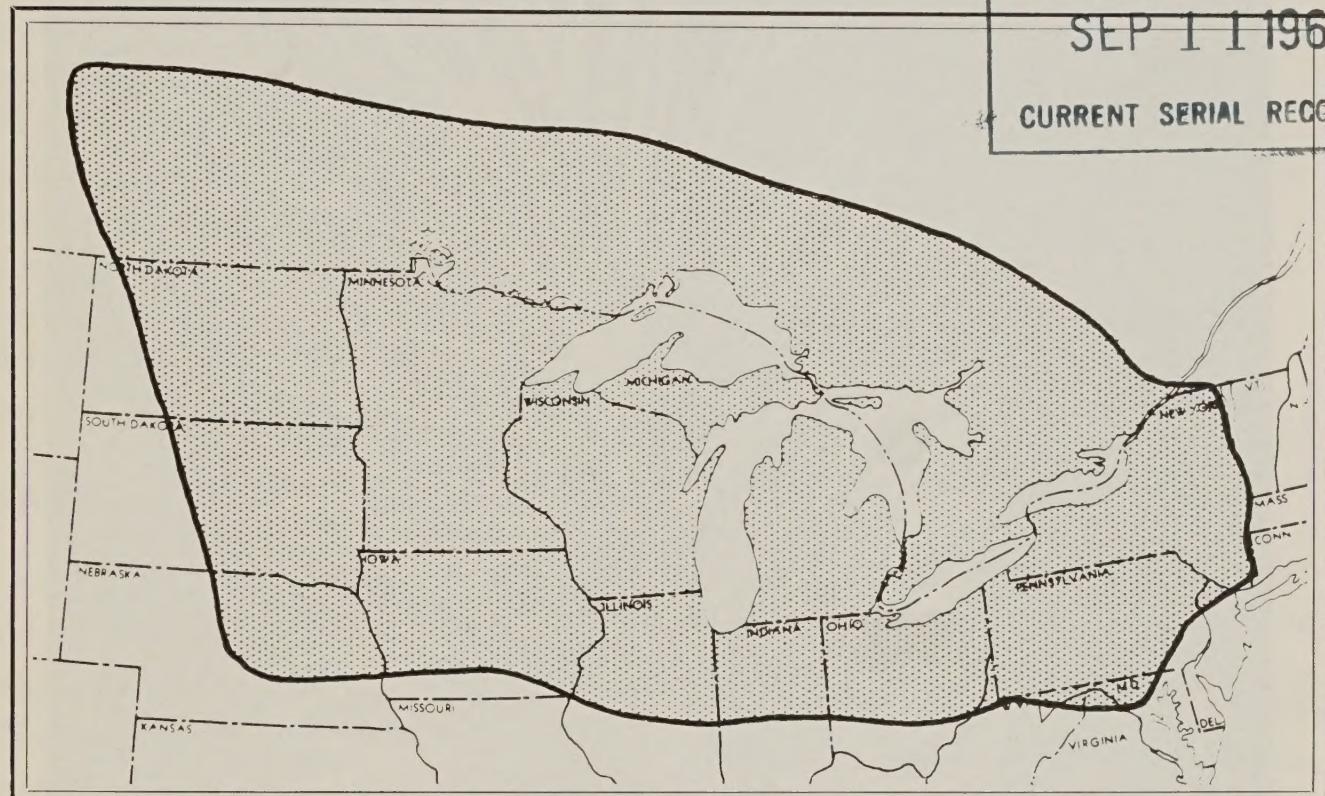


FIGURE 1.—Known distribution of the pine tortoise scale.

The pine tortoise scale (*Toumeyella numismaticum* (P. & M.)) is a soft scale that periodically causes a noticeable amount of mortality of hard pines. Although it was not described until 1920, when it was found on Scotch pine in northern Wisconsin, there is evidence that it had caused injury much earlier in a number of localities in this and other States. Scale damage, noted on Scotch pine and jack pine at St.

Paul, Minn., for several years prior to 1904, has since then been attributed to the pine tortoise scale. The insect itself was first reported in eastern Nebraska in 1911. It was probably brought into Nebraska on infested wildling jack pine seedlings from Wisconsin used to establish an experimental planting in 1891.

The known range (fig. 1) is from Nebraska and the Dakotas east to New York and New Jersey. The insect has also been found in Manitoba and Ontario in Canada. Although the hosts grow naturally or

¹ Lake States Forest Experiment Station, maintained at St. Paul, Minn., by the Forest Service, U.S. Department of Agriculture, in cooperation with the University of Minnesota.

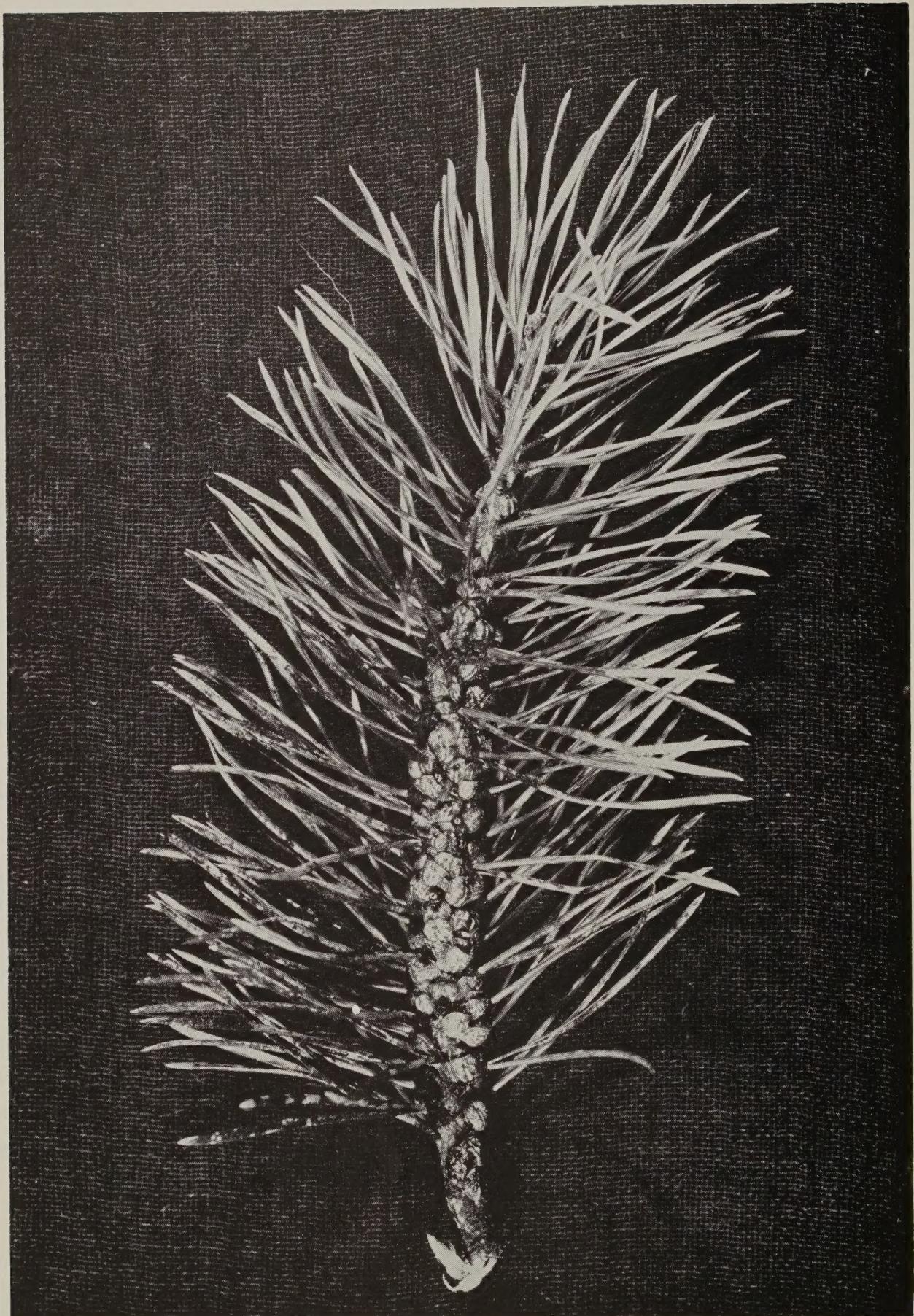


FIGURE 2.—Immature, hibernating female scales. (Courtesy Ohio Agricultural Experiment Station.)

are planted in the New England States and in the eastern Provinces of Canada, there are no records of the presence of this scale in these areas.

The taxonomy of the genus is somewhat confused, and it is possible that some reports refer to species other than *Toumeyella numismaticum*. Recent collections from Pennsylvania, West Virginia, and Maryland are considered as near *numismaticum*. Earlier collections from Pennsylvania, as well as from Connecticut, Michigan, and Florida, refer to a closely related species *T. pini* (King).

Hosts

In the western and northern part of the range—Nebraska, Minnesota, and Manitoba to New York and New Jersey—the preferred hosts are Scotch pine and jack pine. Austrian pine is also a common host, and red pine may be lightly attacked when it is adjacent to or mixed with heavily infested jack pine. Chinese pine has been attacked in Ohio. The form considered as near *numismaticum* is found on Virginia pine in Pennsylvania, West Virginia, and Maryland, while *Toumeyella pini* has been reported on mugho, lodgepole, Scotch, and cluster pines.

Description

The females are wingless. In hibernation or in the immature stages, they are wrinkled and dark brown to black (fig. 2). When

mature, they are reddish brown, oval and convex, and about one-fourth inch long (fig. 3,A).

The males are fragile, winged, and about one-sixteenth inch long. Puparia are the most obvious evidence of their presence; these are a translucent white and usually clustered in large numbers on the twigs (fig. 3,B).

The eggs are ellipsoidal, pinkish, almost transparent, and about one sixty-fourth inch long.

Life History and Habits

There is one generation a year in the northern part of the range of this insect; in the southern part there may be two generations. The overwintered, half-grown females resume activity in spring about the time buds begin to swell. They are mature by early June in the north and somewhat earlier in the south, depending on bud development. Each female produces about 500 eggs; these develop under the mother scale. The nymphs, or young crawlers, appear from late June to early July. The crawlers begin to feed on the twigs almost as soon as they appear. They are dispersed principally by wind and air currents, but may also be carried considerable distances on the feet of birds. A white, powdery substance develops on the margins of the crawlers, and in about 2 weeks sexual differentiation becomes apparent. In about 1 more week the male scales are full grown and they pupate. Following emergence, they fly immediately. They search out and fertilize the immature females

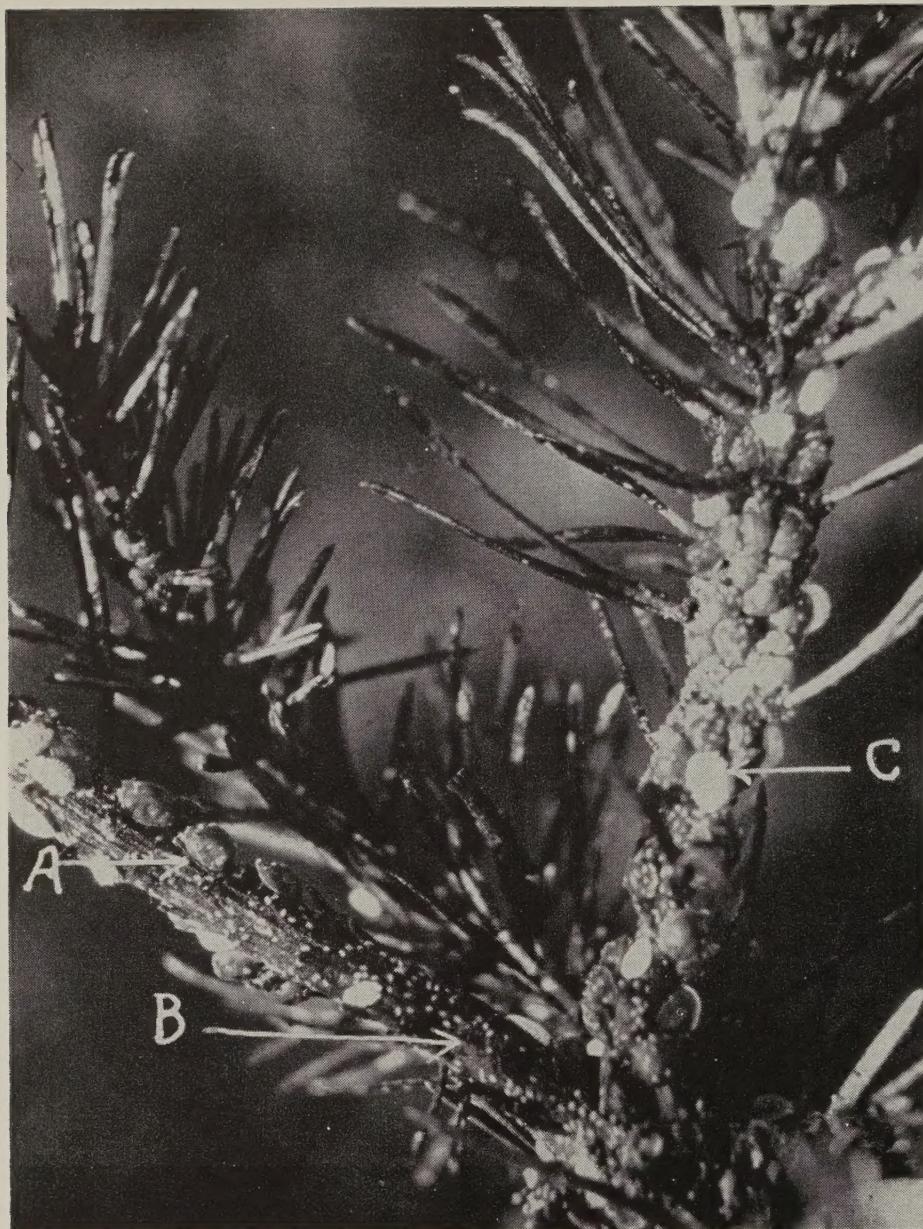


FIGURE 3.—The tortoise scale and predator: *A*, Mature females; *B*, puparia (small white spots on the twigs); *C*, predators (ladybird beetles). (Courtesy University of Wisconsin.)

and die in a few days. These females are immobile; development continues until late in fall, when they go into hibernation.

Damage and Evidence of Attack

Heaviest damage occurs on seedlings and young saplings, although pole stands are sometimes severely attacked. The injury causes noticeable branch mortality or death of the entire tree. In a heavy infestation a very large percentage of the trees may die in one or two seasons of attack. In most heavily infested jack pine stands, however, a striking characteristic is the presence of

occasional trees that escape damage completely, apparently because of an inherited immunity. The heavy secretion of honeydew by the feeding immature females results in the development of a sooty mold and gives a glistening, dark appearance to the foliage (fig. 4). Ants, attending the scales and feeding on the honeydew, may be very numerous.

Natural Control

Because this scale is often very effectively controlled by natural factors, the forest landowner should examine his trees to determine the



FIGURE 4.—Heavy attacks cause a sooty mold on the foliage. (Courtesy Ohio Agricultural Experiment Station.)

abundance of these factors, before resorting to the use of insecticides. Several species of ladybird beetles (Coccinellidae), in the larval stages as well as in the adult stage, attack the young scales and the eggs under the mature female scales (fig. 3,C). Heavy scale infestations have been almost completely destroyed by these predators. *Hyperaspis congre-
ssis* Watson, previously considered as *binotata* (Say), is by far the most abundant species. Also reported as exerting a strong controlling effect in various parts of the scale's range are *Hyperaspis signata* (Oliv.), *Chilocorus bivulnerus* Muls., *Scymnus lacustris* Lec., *Coccinella transversoguttata* Fald., *C. trifasciata* L., *C. novemnotata* Hbst., and the chalcid parasite, *Microterus fuscicornis* (Howard). The larvae of the pyralid moth *Laetilia coccidivora* (Comst.) noticeably reduced scale populations in Ohio in the late thirties and in Maryland, West Virginia, and Pennsylvania in 1957.

Chemical Control

Although malathion will control the crawlers, it has a relatively short residual effect, and crawlers emerging a week after spraying will not be affected. Consequently in a heavy infestation a second treatment may be necessary. Small individual trees can be treated with a one-half of 1 percent emulsion in water, using a tank-type garden sprayer with a fine nozzle. Larger trees or plantations can be treated with a 5-percent formulation by mist blower at the rate of 6 gallons per acre. For aerial spraying the dosage should be 1 pound in 2 gallons of water per acre.

Lime sulfur, at the rate of 1 part toxicant to 11 parts of water, has given satisfactory results as a dormant spray.

Caution: Although malathion has a low toxicity to mammals and is considered relatively safe, it contains toxic chemicals and should be handled with care by the operator.

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